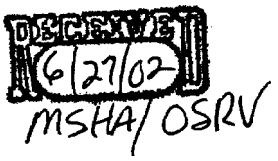
Aduanced Technologies and laboratories International, Inc.

20251 Century **Blvd.,** Suite 200
Germantown, MD **20874**
Phone: **301.972.4430**
Fax: 301.972.6904
www.atlintl.com

Received July 2, 2002
4:30 PM
Date Stamped June 27, 2002

June 27, 2002

Marvin W. Nichols Jr, Director
Office of Standards, Regulations, & Variances
Mine Safety and Health Administration
,1100 Wilson Blvd., 21st Floor
Arlington. VA 22209-3939



Re: Advanced Notice of Proposed Rule-Making
Asbestos

by e-mail; copy to follow

Dear Mr. Nichols:

I enclose comments on the ANPR for asbestos on behalf of the United Mine Workers of America. These rules are long over-due and we appreciate the opportunity to comment on them. We look forward to a proposed rule.

Sincerely,

James L. Weeks, ScD, CIH
Senior Scientist
Consultant to the UMWA

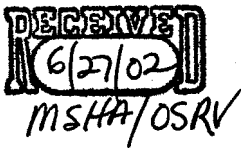
Enclosure:
Comments
List of References on Analytical Methods

c: Joe Main, **UMWA**

AB24-Comm-30

Comments on
MSHA proposed asbestos rule;
67 FR 15134-38, March 29,2002

James L. Weeks, ScD, CIH,
for the United Mine Workers of America



(Responses are labeled by the list of questions
MSHA raised in the Announcement)

*1. **Asbestos** PEL*

a. We recommend that MSHA adopt the OSHA PEL as the exposure limit for miners. This PEL is very well documented in the OSHA rule-making process that culminated in the rule in 1994. The OSHA standard, however, also calls for employee monitoring for those employees " . .who are or may reasonably be expected to be exposed to airborne concentrations at or above the . . [PEL]. This provision should be adopted as well, considering the hazards of asbestos exposure and existing exposure to other hazardous airborne particulates, such as coal mine dust, diesel particulate matter, and silica. Furthermore, MSHA should monitor miners' exposure to all particulates simultaneously and apply the formula for evaluating mixtures. Silica, diesel particulate matter, and asbestos are all potential lung carcinogens.

b. The results of MSHA monitoring, showing that all samples were below the OSHA PEL of 0.1 f/cc, demonstrates that this exposure limit is feasible in mining and consequently, there should be no difficulty adopting and enforcing this limit, especially given the precedent of the OSHA PEL.

***2. Analytical** Method*

c. The advantage of the TEM is its better resolution and greater confidence in identifying fibers and distinguishing them from other particulates. MSHA might consider using a scanning electron microscope (SEM) as a backup method.

d. We have no information on the availability and cost of using a TEM. We suspect that there are many used devices that would be satisfactory and inexpensive for MSHA to purchase and use.

e. MSHA should use the TEM for determining compliance or non-compliance.

f. We searched the medical literature concerning the health effects of asbestos as measured by TEM and enclose the references for your information, without comment.

AB24 - Comm - 30

g. We also searched the environmental health literature for side by side comparisons of PCM and TEM and enclose these references for your information, without comment.

h. We suggest that MSHA use the NIOSH method for analysis of bulk samples because it is validated and intended to evaluate occupational exposure.

3. Take-Home Contamination

i. Take-home contamination by asbestos is best addressed by providing workers with protective clothing, space, and time to change and shower before leaving work. Since this activity is directly related to workers' jobs, time that workers spend changing clothes and cleaning up should be dedicated time, on the clock and the employer should provide facilities to do so (i.e., change room and showers, separate for men and women.)

j. MSHA should provide small mine operators technical assistance necessary for evaluating and controlling asbestos exposure but no mine operator should be exempt from these rules. Workers employed by small mine operators should have the same health protections as any others, just as they should have equal protection under the law.

k. A model program should be apparent in the regulations and MSHA should provide technical assistance to clarify regulations and to assist mine operators in complying with them. MSHA should also be available for the purpose of education and training concerning these regulations. After a period of mine operators becoming familiar with the regulations, however, MSHA should enforce them as with any other regulations.

l. We are not aware of specific types of protective clothing that miners are using. However, in industries under OSHA's jurisdiction, workers are using . . .

m. We are not aware of preventive measures that miners use. However, in industries under OSHA's jurisdiction, workers are using . . .

4. Sampling and Awareness of Asbestos Hazards.

n. We are not aware of analytical methods for distinguishing crystalline mineral dust from mineral fibers. We suggest you approach NIOSH with this question. We also wish to repeat that with any sample, you analyze for every particulate on the filter: silica, diesel particulate, and asbestos and apply the formula for evaluating mixtures of similar hazards.

o. MSHA's current field sampling obviously does not meet the needs of the mining community. If it did, the problems that appeared in Libby would have become

more apparent sooner than they did. You might have detected asbestos fiber exposure that was below the exposure limit at the time but significantly above the OSHA PEL. While you would not be able to issue a citation for non-compliance, you would have some data to share with, for example, NIOSH.

p. Mine operators and others can make miners aware of potential hazards of asbestos through conventional methods of education, i.e., written materials and training. This task should not fall only to mine operators. Unions, community organizations, state government agencies (e.g., departments of health, mining departments) and MSHA all have contributions to make.

q. A program to sample and analyze for asbestos should be explained by MSHA with hands-on training with samplers and demonstration of the kinds of findings one can get with a TEM either by itself or in comparison with PCM.

r. Engineering controls should be emphasized as the best means of control and MSHA or mine operators could turn to, for example, personal protective equipment, only as a temporary measure or as a last resort. Most operators and MSHA foresake engineering controls too soon.

5. Impact

s. We do not know how many miners are currently exposed to asbestos.

t. In general, the appropriate engineering controls are, when asbestos occurs as part of a mineral deposit, water and ventilation. When asbestos occurs as a part of a building structure, the two generic options are either to totally enclose it or remove it. This decision is best made by a careful on-site examination of the condition of the asbestos wherever it **is.**

u. The benefits of this rule are to reduce the **risk** of asbestos-related disease and in so-doing, create a working environment in which workers have assurance that this hazard is being monitored and controlled.

v. We have no comments on cost estimates. However, given the data on exposure presented earlier, that all exposure measurements were below the 0.1 f/cc limit, mine operators should be able to continue whatever they are doing, in which case, cost would be minimal.

Our final comment is that MSHA should hold a hearing in Libby, MT. This is the community in which the issue gained prominence, in which there were many unnecessary deaths, and in which stress and anxiety remain. They should know what MSHA is doing to prevent a recurrence and they should be allowed to comment on it.

MEDLINE "TEM" AND "Exposure" June 27, 2002

<1>
UI - 10808262
MI - 20268307
AU - Fowler DP
IN - Fowler Associates Occupational and Environmental Health Services, Inc., Redwood City, California, USA.
TI - Exposures to asbestos arising from bandsawing gasket material.
SO - Applied Occupational & Environmental Hygiene. 2000 May;15(5):404-8
AB - A simulation of bandsawing sheet asbestos gasket material was performed as part of a retrospective exposure evaluation undertaken to assist in determining causation of a case of mesothelioma. The work was performed by bandsawing a chrysotile asbestos (80%)/neoprene gasket sheet with a conventional 16-inch woodworking bandsaw inside a chamber. Measurements of airborne asbestos were made using conventional area and personal sampling methods, with analysis of collected samples by transmission electron microscopy (TEM) and phase contrast microscopy (PCM). These were supplemented by qualitative scanning electron microscopy (SEM) examinations of some of the airborne particles collected on the filters. In contrast with findings from studies examining manual handling (installation and removal) of gaskets, airborne asbestos concentrations from this operation were found to be well above current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) (eight-hour time-weighted average [TWA]) and excursion limit (30-minute) standards. Although some "encapsulation" effect of the neoprene matrix was seen on the particles in the airborne dust, unencapsulated individual fiber bundles were also seen. Suggestions for the implications of the work are given. In summary, the airborne asbestos concentrations arising from this work were quite high, and point to the need for careful observation of common sense precautions when manipulation of asbestos-containing materials (even those believed to have limited emissions potential) may involved machining operations.

<2>
UI - 10461401
MI - 99390502
AU - Yeung P
AU - Patience K
AU - Apthorpe L
AU - Willcocks D
IN - Worksafe Australia, Sydney, Australia.
TI - An Australian study to evaluate worker exposure to chrysotile in the automotive service industry.
SO - Applied Occupational & Environmental Hygiene. 1999 Jul;14(7):448-57
AB - A study was conducted in Sydney, Australia, in 1996 to investigate the current exposure levels, control technologies, and work practices in five service garages (four car and one bus), three brake bonding workshops, and one gasket processing workshop. This study formed part of the assessment of chrysotile as a priority existing chemical under the Australian National Industrial Chemicals Notification and Assessment Scheme. A total of 68 (11 personal and 57 area) air samples were collected, in accordance with the Australian standard membrane filter method. Fiber concentrations were determined by the traditional phase contrast microscopy (PCM) method and 16 selected samples were analyzed by the more powerful transmission electron microscopy (TEM). Chrysotile exposure of car mechanics measured by PCM was typically below the reportable detection limit of 0.05 f/mL, irrespective of whether disc brake, drum brake, or clutch was being serviced. These low levels can be attributed to the wet cleaning or aerosol spray methods used in recent years to replace the

traditional compressed air jet cleaning. In the three brake shoe relining workshops, task-specific exposure reached up to 0.16 f/mL in the processes of cutting and radius grinding. TEM results were generally higher, due to its higher resolution power. The median diameter on samples taken from the service garages (passenger cars), as determined by TEM, was 0.5-1.0 micron; and was between 0.2-0.5 micron for the brake bonding and gasket processing workshops, while that for the bus service depot was 0.1-0.2 micron. Most of the respirable fibers (84%, mainly forsterite) from the bus service depot were below 0.2 micron in diameter which is the resolution limit of PCM. In the brake bonding and gasket cutting workshops, 34 percent and 44 percent of the chrysotile fibers were below 0.2 micron in diameter.

<3>
UI - 10097051
MI - 99199198
AU - Nolan RP
AU - Langer ***AM***
AU - Wilson R
IN - Environmental Sciences Laboratory, Brooklyn College of The City University of New York, 2900 Bedford Avenue, Brooklyn, NY 11210, USA. rnolan@brooklyn.cuny.edu
TI - A risk assessment for exposure to grunerite asbestos (amosite) in an iron ore mine.
SO - Proceedings of the National Academy of Sciences of the United States of America. 1999 Mar 30;96(7):3412-9
LM - Himmelfarb Library has partial holdings
AB - The potential for health risks to humans exposed to the asbestos minerals continues to be a public health concern. Although the production and use of the commercial amphibole asbestos minerals-grunerite (amosite) and riebeckite (crocidolite)-have been almost completely eliminated from world commerce, special opportunities for potentially significant exposures remain. Commercially viable deposits of grunerite asbestos are very rare, but it can occur as a gangue mineral in a limited part of a mine otherwise thought asbestos-free. This report describes such a situation, in which a very localized seam of grunerite asbestos was identified in an iron ore mine. The geological occurrence of the seam in the ore body is described, as well as the mineralogical character of the grunerite asbestos. The most relevant epidemiological studies of workers exposed to grunerite asbestos are used to gauge the hazards associated with the inhalation of this fibrous mineral. Both analytical transmission electron microscopy and phase-contrast optical microscopy were used to quantify the fibers present in the air during mining in the area with outcroppings of grunerite asbestos. Analytical transmission electron microscopy and continuous-scan x-ray diffraction were used to determine the type of asbestos fiber present. Knowing the level of the miner's exposures, we carried out a risk assessment by using a model developed for the Environmental Protection Agency.

<4>
UI - 10086201
MI - 99186120
AU - Finkelstein MM
AU - Dufresne A
IN - Ontario Ministry of Labour, Toronto, Canada. murray.finkelstein@utoronto.ca
TI - Inferences on the kinetics of asbestos deposition and clearance among chrysotile miners and millers.
SO - American Journal of Industrial Medicine. 1999 Apr;35(4):401-12
LM - Himmelfarb Library has partial holdings

AB - BACKGROUND: The health effects of asbestos are intimately related to the fate of inhaled fibers in the lungs. The kinetics of asbestos fibers have been studied primarily in rodents. The objective of this study was to explore the application of these kinetic models to human autopsy data. METHODS: We analyzed the asbestos fiber content of the lungs of 72 Quebec chrysotile miners and millers and 49 control subjects using analytical transmission electron microscopy. Statistical methods included standard multivariate linear regression and locally weighted regression methods. RESULTS: The lung burdens of asbestos bodies and chrysotile and tremolite fibers were correlated, as were the concentrations of short, medium, and long fibers of each asbestos variety. There were significant associations between the duration of occupational exposure and the burdens of chrysotile and tremolite. The concentration of chrysotile decreased with the time since last exposure but the concentration of tremolite did not. The clearance rate varied inversely with the length of chrysotile fibers. For fibers greater than 10 mu in length the clearance half-time was estimated to be 8 years. CONCLUSIONS: The patterns in our data are compatible with both of the hypotheses suggested from rodent experiments; the existence of a long-term sequestration compartment and overload of clearance mechanisms in this compartment.

<6>
UI - 8888636
MI - 97043519
AU - Spence SK
AU - Rocchi PS
IN - ARCO Chemical Ltd, Rotterdam, The Netherlands.
TI - Exposure to asbestos fibres during gasket removal.
SO - Annals of Occupational Hygiene. 1996 Oct;40(5):583-8
AB - In the chemical industry, asbestos gaskets have been used extensively to prevent leakage between solid surfaces. The purpose of this study was to assess the potential personal exposure to asbestos fibres during gasket removal and thus to determine what is reasonably required in terms of protective regime and work method. Two groups were studied: group A, who only removed gaskets if they could be removed easily and without breaking; and group B, who removed gaskets which were left by the first group. For both groups, the gasket was first made wet before removal. The samples were analysed using phase-contrast microscopy and transmission electron microscopy. The average exposure to fibres for group A, averaged over the work period, was 0.04-0.242 fibres ml-1 as determined by phase-contrast microscopy. On further analysis with transmission electron microscopy it was found that only four of the 11 samples contained asbestos in very low concentrations and that most of the fibres, which were identified using phase-contrast microscopy, probably originated from the glass fibre lagging around the pipes. For group B the average fibre concentration, averaged over the work period, as determined by phase-contrast microscopy, ranged between below the detection limit and 0.02 fibres ml-1. The subsequent transmission electron microscopy analysis shows that the exposure to asbestos fibres ranged between below the limit of detection to 0.004 fibres ml-1. This study shows that the exposure to asbestos fibres during gasket removal activities was well within the 8-h average exposure limit of 0.3 fibres ml-1.

<10>
UI - 3305596
MI - 87308940
AU - Chang SN
AU - White LE
AU - Scott WD
TI - Assessing asbestos exposure potential in nonindustrial settings.

SO - Journal of Community Health. 1387 Summer-Fall;12(2-3):176-84
AB - The presence of asbestos containing materials (ACM) in office and commercial buildings is a significant environmental problem. Asbestosis, mesothelioma and lung cancer have been linked with industrial exposure to airborne asbestos. The extensive use of asbestos products in buildings has raised concerns about the widespread exposure of the general public to asbestos in nonoccupational settings. The presence of asbestos in a building does not necessarily mean that significant exposure of the occupants of the building has occurred, but it is important that the asbestos be monitored regularly to ensure that fibers do not become airborne. If ACM are contained within a matrix and not disturbed, exposure is unlikely. However, if the asbestos becomes friable (crumbling) or if building maintenance, repair, renovation or other activities disturb ACM, airborne asbestos fibers may be a source of exposure to the occupants of the building. Currently, asbestos exposure assessment is conducted by a phase contrast light microscope (PCM) technique. Due to its inherent limitation in resolution and the generic counting rules used, analysis by the PCM method underestimates the airborne asbestos fiber concentration as compared to analysis by transmission electron microscopy (TEM). It is important that the air monitoring results analyzed by PCM be interpreted carefully in conjunction with a survey by a professional to judge the physical condition of the ACM in buildings. Exposure levels to airborne asbestos fibers vary from day to day and depend on the physical condition of the material involved and the type of operating and maintenance program in place. (ABSTRACT TRUNCATED AT 250 WORDS)

<11>
UI - 3830113
MI - 87161728
AU - Omenn GS
AU - Merchant J
AU - Boatman E
AU - Dement JM
AU - Kuschner M
AU - Nicholson W
AU - Peto J
AU - Rosenstock L
TI - Contribution of environmental fibers to respiratory cancer.
SO - Environmental Health Perspectives. 1986 Dec;70:51-6
LM - Himmelfarb Library has partial holdings
AB - This article reviews studies of the carcinogenicity of mineral fibers, notably asbestos, and presents seven major recommendations for further research. Mineral fibers represent the greatest cause--after cigarette smoke--of respiratory cancer due to air pollutants. Past asbestos exposure may currently account for 2000 mesothelioma deaths per year and 4000 to 6000 lung cancer deaths per year. All major commercial types of asbestos (crocidolite, amosite, and chrysotile) can cause each of the major asbestos-related respiratory diseases. Lung cancers in asbestos-exposed individuals probably do not have a different distribution of histological types from that of non-asbestos-related lung cancers. Nonoccupational exposures are likely to be associated with malignant disease outcomes qualitatively similar to those associated with occupational exposures. Further investigations *of* fibers are needed to characterize the relationships among physicochemical properties, patterns of migration and clearance, dose, and adverse health effects. Transmission electron microscopy has been found to be the preferred method of analysis of environmental fibers. Relations among time factors (e.g., age at first exposure), dose, and risk for adverse health effects require analyses of existing and new epidemiologic studies *of* exposed cohorts. Concomitant exposure,

behavioral factors, and host factors affecting susceptibility to asbestos should be identified.

<12>
UI - 3017102
MI - 86292960
AU - Rodelsperger K
AU - Jahn H
AU - Bruckel B
AU - Manke J
AU - Paur R
AU - Woitowitz HJ
TI - Asbestos dust exposure during brake repair.
SO - American Journal of Industrial Medicine. 1986;10(1):63-72
LM - Himmelfarb Library has partial holdings
AB - About 10,000 tons of chrysotile per year are used in the Federal Republic of Germany for the production of friction materials. During brake repair an unknown number of approximately 300,000 mechanics in automobile service stations are exposed to asbestos dust. In a field study, asbestos fiber concentrations during brake repair were measured. Occupational histories and chest X-rays of brake service mechanics are being examined. Ninety dust measurements in 76 service stations were made by phase contrast microscopy and by scanning transmission electron microscopy. By electron microscopy, extremely fine chrysotile fibers with lengths less than 5 microns were identified in brake drum dust. Fibers with lengths greater than or equal to 5 microns constituted less than **1%** of all chrysotile fibers counted in brake drum dust. Short-term asbestos dust exposures were measured by light microscopy in 101 personal samples during blowing out of brakes, and grinding and turning of brake linings. During blowing out of car brakes, as well as during grinding of brake linings, the product of fiber concentration with length greater than 5 microns and sampling time amounted to about 4-5 fibers/ml X min corresponding to a concentration of 10(6) fibers/m3 over 4-5 min. For trucks and buses higher amounts of 5-10 X 10(6) fibers/m3 X min were observed during these operations. From occupational histories of 210 vehicle mechanics, an average duration of employment of mean s = 21 **10** years and a mean cumulative fiber dose of mean s = (0.54 **1.1)** X 10(6) fibers/m3 X years were calculated.

<14>
UI - 6095717
MI - 85070678
AU - Marconi A
AU - Menichini E
AU - Paoletti L
TI - A comparison of light microscopy and transmission electron microscopy results in the evaluation of the occupational exposure to airborne chrysotile fibres.
SO - Annals of Occupational Hygiene. 1984;28(3):321-31

MEDLINE: "Asbestos: AND "Transmission Electron Microscopy" AND "Phase Contrast Microscopy" June 27, 2002

<1>
UI - 10808262
MI - 20268307
AU - Fowler DP
IN - Fowler Associates Occupational and Environmental Health Services, Inc., Redwood City, California, USA.
TI - Exposures to asbestos arising from bandsawing gasket material.
SO - Applied Occupational & Environmental Hygiene. 2000 May;15(5):404-8
AB - A simulation of bandsawing sheet asbestos gasket material was performed as part of a retrospective exposure evaluation undertaken to assist in determining causation of a case of mesothelioma. The work was performed by bandsawing a chrysotile asbestos (80%)/neoprene gasket sheet with a conventional 16-inch woodworking bandsaw inside a chamber. Measurements of airborne asbestos were made using conventional area and personal sampling methods, with analysis of collected samples by transmission electron microscopy (TEM) and phase contrast microscopy (PCM). These were supplemented by qualitative scanning electron microscopy (SEM) examinations of some of the airborne particles collected on the filters. In contrast with findings from studies examining manual handling (installation and removal) of gaskets, airborne asbestos concentrations from this operation were found to be well above current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) (eight-hour time-weighted average [TWA]) and excursion limit (30-minute) standards. Although some "encapsulation" effect of the neoprene matrix was seen on the particles in the airborne dust, unencapsulated individual fiber bundles were also seen. Suggestions for the implications of the work are given. In summary, the airborne asbestos concentrations arising from this work were quite high, and point to the need for careful observation of common sense precautions when manipulation of asbestos-containing materials (even those believed to have limited emissions potential) may involved machining operations.

<2>
UI - 10461401
MI - 99390502
AU - Yeung P
AU - Patience K
AU - Apthorpe L
AU - Willcocks D
IN - Worksafe Australia, Sydney, Australia.
TI - An Australian study to evaluate worker exposure to chrysotile in the automotive service industry.
SO - Applied Occupational & Environmental Hygiene. 1999 Jul;14(7):448-57
AB - A study was conducted in Sydney, Australia, in 1996 to investigate the current exposure levels, control technologies, and work practices in five service garages (four car and one bus), three brake bonding workshops, and one gasket processing workshop. This study formed part of the assessment of chrysotile as a priority existing chemical under the Australian National Industrial Chemicals Notification and Assessment Scheme. A total of 68 (11 personal and 57 area) air samples were collected, in accordance with the Australian standard membrane filter method. Fiber concentrations were determined by the traditional phase contrast microscopy (PCM) method and 16 selected samples were analyzed by the more powerful transmission electron microscopy (TEM). Chrysotile exposure of car mechanics measured by PCM was typically below the reportable detection limit of 0.05 f/mL, irrespective of whether disc brake,

drum brake, or clutch was being serviced. These low levels can be attributed to the wet cleaning or aerosol spray methods used in recent years to replace the traditional compressed air jet cleaning. In the three brake shoe relining workshops, task-specific exposure reached up to 0.16 f/mL in the processes of cutting and radius grinding. TEM results were generally higher, due to its higher resolution power. The median diameter on samples taken from the service garages (passenger cars), as determined by TEM, was 0.5-1.0 micron; and was between 0.2-0.5 micron for the brake bonding and gasket processing workshops, while that for the bus service depot was 0.1-0.2 micron. Most of the respirable fibers (84%, mainly forsterite) from the bus service depot were below 0.2 micron in diameter which is the resolution limit of PCM. In the brake bonding and gasket cutting workshops, 34 percent and 44 percent of the chrysotile fibers were below 0.2 micron in diameter.

<4>
UI - 8888636
MI - 97043519
AU - Spence **SK**
AU - Rocchi PS
IN - ARCO Chemical Ltd, Rotterdam, The Netherlands.
TI - Exposure to asbestos fibres during gasket removal.
SO - Annals of Occupational Hygiene. 1996 Oct;40(5):583-8
AB - In the chemical industry, asbestos gaskets have been used extensively to prevent leakage between solid surfaces. The purpose of this study was to assess the potential personal exposure to asbestos fibres during gasket removal and thus to determine what is reasonably required in terms of protective regime and work method. Two groups were studied: group A, who only removed gaskets if they could be removed easily and without breaking; and group B, who removed gaskets which were left by the first group. For both groups, the gasket was first made wet before removal. The samples were analysed using phase-contrast microscopy and transmission electron microscopy. The average exposure to fibres for group A, averaged over the work period, was 0.04-0.242 fibres ml-1 as determined by phase-contrast microscopy. On further analysis with transmission electron microscopy it was found that only four of the 11 samples contained asbestos in very low concentrations and that most of the fibres, which were identified using phase-contrast microscopy, probably originated from the glass fibre lagging around the pipes. For group B the average fibre concentration, averaged over the work period, as determined by phase-contrast microscopy, ranged between below the detection limit and 0.02 fibres ml-1. The subsequent transmission electron microscopy analysis shows that the exposure to asbestos fibres ranged between below the limit of detection to 0.004 fibres ml-1. This study shows that the exposure to asbestos fibres during gasket removal activities was well within the 8-h average exposure limit of 0.3 fibres ml-1.

<6>
UI - 7473284
MI - 96054469
AU - Davis DR
IN - Department of Restorative Dentistry, University of California, San Francisco, USA.
TI - Release of asbestos fibers during casting ring liner manipulation.
SO - Journal of Prosthetic Dentistry. 1995 Sep;74(3):294-8

AB - Civil lawsuits have been filed that allege wrongful deaths of at least one dentist and one dental technician from asbestos exposure. However, no known published scientific studies support such allegations. To assess what potential exposure could occur, air samples were collected while casting rings were lined with asbestos liner. Fibers were collected on filters and counted by use of phase-contrast microscopy and transmission electron microscopy. The concentrations of fibers 5 microns long or greater on all filters was less than allowed by federal guidelines. Based on this simulation the potential health risk from using asbestos ring liner seems low.

<7>
UI - 7978971
MI - 95069682
AU - Corn M
TI - Airborne concentrations of asbestos in non-occupational environments.
SO - Annals of Occupational Hygiene. 1994 Aug;38(4):495-502, 410
AB - Concentrations of asbestos in air were determined from analysis of samples collected in over 300 buildings involved in litigation. Samples were collected by certified industrial hygienists and analysed in certified laboratories by transmission electron microscopy. Building group mean concentrations of asbestos in building air inhaled by occupants were generally less than 0.0005 f ml-5 > 5 microns (90th percentile). At these concentrations the risk from asbestos exposure would be very low for building occupants. Another data set was obtained from the maintenance logs kept by owners of buildings containing asbestos fireproofing and subject to Operations and Maintenance Programmes to evaluate asbestos inhalation risk to maintenance workers. The logs were kept to document protective measures and maintenance personnel exposures during 1991-1992. Data are presented for one commercial building, which is typical of data for three additional commercial buildings and a medical centre. All samples were evaluated by the NIOSH 1400 protocol for sampling and analysis by phase contrast microscopy. Operations and maintenance precautions to reduce dust emission were modest; they included spraying of ceiling tiles with amended water, HEPA vacuuming tile edges before entry and after tile replacement, respirator usage and careful work. Negative pressure containment was not used. In this building personal exposures in electrical/plumbing work ranged from 0.000 to 0.035 f ml-1 > 5 microns in length (average work time of one job was 118 min); the 8-h TWA was 0.0149 f ml-1 > 5 microns.(ABSTRACT TRUNCATED AT 250 WORDS)

<8>
UI - 2236747
MI - 91046997
AU - Chesson J
AU - Rench JD
AU - Schultz BD
AU - Milne KL
IN - Chesson Consulting, Inc., Washington, D.C. 20036.
TI - Interpretation of airborne asbestos measurements. [see comments.].
CM - Comment in: Risk Anal. 1991 Sep;11(3):367-71 ; 1947338
SO - Risk Analysis. 1990 Sep;10(3):437-47
AB - Transmission electron microscopy (TEM) is the preferred method of measuring airborne asbestos in buildings, but TEM measurements cannot be used directly in the existing equations relating risk to exposure because the equations are based on measurements made with a different technique--phase contrast microscopy (PCM). Comparison between measurements made by different methods is not simple because the methods differ in the size of particles they

can detect, and the relationship between exposure and disease is thought to depend on, among other things, asbestos fiber size. Previous suggestions for converting TEM measurements to PCM equivalents lack generality because they fail to take into account the size distribution of the asbestos particles and the expectation that fiber-size distributions in current nonoccupational environments could differ from the workplaces of the past on which the risk equations are based. A mathematical model is presented for investigating the conversion of airborne asbestos measurements made by one method to an equivalent measurement made by another method. "Equivalent" means having the same potential to cause disease. The model clarifies the issues of concern and suggests approaches for obtaining meaningful conversion factors that will allow TEM measurements to be used in PCM-based risk equations.

<10>
UI - 3035911
MI - 87238408
AU - Snyder JG
AU - Virta RL
AU - Segreti JM
TI - Evaluation of the phase contrast microscopy method for the detection of fibrous and other elongated mineral particulates by comparison with a STEM technique.
SO - American Industrial Hygiene Association Journal. 1987 May;48(5):471-7
LM - Himmelfarb Library has partial holdings
AB - The USPHS/NIOSH Membrane Filter Method is used to monitor for asbestos in occupational and mining atmospheres, and employs the phase-contrast optical microscope (PCM) that under optimum conditions has a resolution of approximately 0.25 micron. While amphibole cleavage fragments are usually visible by PCM, asbestos fibers (such as amosite and chrysotile) have finer widths that may render them invisible by PCM. In this study, personal air-monitoring filters containing chrysotile, amosite and amphibole cleavage fragments from various sources have been analyzed by PCM in accordance with the USPHS/NIOSH Method and scanning transmission electron microscopy (STEM) to assess the effectiveness ***of*** the PCM technique. Each STEM specimen was prepared using a direct-transfer technique to ensure that particle size distribution and concentration were not altered. STEM results for chrysotile samples are highly variable, with 9% to 81% of regulatory particles having widths smaller than 0.25 micron--the resolution of the optical microscope. Amosite samples have 27% to 38% of regulatory particles with widths below microscope resolution, indicating that routine particle counts by PCM on these samples would underestimate true fiber content by approximately one-third. All amphibole cleavage fragment samples had regulatory particles that would be observed by PCM. Multiplication factors have been suggested for application to routine counts by PCM to more accurately assess true particle content for mineral particulates on personal air-monitoring filters.

<11>
UI - 3017102
MI - 86292960
AU - Rodelsperger K
AU - Jahn H
AU - Bruckel B
AU - Manke J
AU - Paur R
AU - Woitowitz **HJ**

TI - Asbestos dust exposure during brake repair.
SO - American Journal of Industrial Medicine. 1986;10(1):63-72
LM - Himmelfarb Library has partial holdings
AB - About 10,000 tons of chrysotile per year are used in the Federal Republic of Germany for the production of friction materials. During brake repair an unknown number of approximately 300,000 mechanics in automobile service stations are exposed to asbestos dust. In a field study, asbestos fiber concentrations during brake repair were measured. Occupational histories and chest X-rays of brake service mechanics are being examined. Ninety dust measurements in 76 service stations were made by phase contrast microscopy and by scanning transmission electron microscopy. By electron microscopy, extremely fine chrysotile fibers with lengths less than 5 microns were identified in brake drum dust. Fibers with lengths greater than or equal to 5 microns constituted less than 1% of all chrysotile fibers counted in brake drum dust. Short-term asbestos dust exposures were measured by light microscopy in 101 personal samples during blowing out of brakes, and grinding and turning of brake linings. During blowing out of car brakes, as well as during grinding of brake linings, the product of fiber concentration with length greater than 5 microns and sampling time amounted to about 4-5 fibers/ml X min corresponding to a concentration of 10(6) fibers/m3 over 4-5 min. For trucks and buses higher amounts of 5-10 X 10(6) fibers/m3 X min were observed during these operations. From occupational histories of 210 vehicle mechanics, an average duration of employment *of* mean s = 21 10 years and a mean cumulative fiber dose of mean s = (0.54 1.1) X 10(6) fibers/m3 X years were calculated.

<12>
UI - 3881254
MI - 85101297
AU - Chadwick DA
AU - Buchan RM
AU - Beaulieu HJ
TI - Airborne asbestos in Colorado public schools.
SO - Environmental Research. 1985 Feb;36(1):1-13
AB - Levels of airborne asbestos for six Colorado public school facilities with sprayed-on asbestos materials were documented using three analytical techniques. Phase contrast microscopy showed levels up to the thousandths of a fiber per cubic centimeter (f/cc), scanning electron microscopy (SEM) up to the hundredths of a f/cc, and transmission electron microscopy coupled to selected area electron diffraction and energy dispersive X-ray analysis (TEM-SAED-EDXA) up to the tenths of an asbestos f/cc. Phase contrast microscopy was found to be an inadequate analytical technique for documenting the levels of airborne asbestos fibers in the schools: only large fibers which were not embedded in the filter were counted, and asbestos fibers were not distinguished from nonasbestos.

<13>
UI - 6377863
MI - 84253486
AU - Pang TW
AU - Dicker WL
AU - Nazar MA
TI - An evaluation of the precision and accuracy of the direct transfer method for the analysis of asbestos fibers with comparison to the NIOSH method.
SO - American Industrial Hygiene Association Journal. 1984 May;45(5):329-35
LM - Himmelfarb Library has partial holdings

AB - Transmission electron microscopy (TEM) of asbestos on polycarbonate membrane filters prepared using the direct transfer (DT) method is used as a reference for determining the precision and accuracy of phase contrast microscopy (PCM) of the same filters and for determining the correlation between DT-PCM and the NIOSH method of asbestos analysis. Replicate aliquots of an aqueous suspension of chrysotile were filtered through either polycarbonate or cellulosic membrane filters. The polycarbonate filters were prepared using the DT method and analyzed using TEM and PCM; the cellulosic filters were treated and analyzed using the NIOSH method. Compared to the results of the TEM examination of the polycarbonate filters, about 50% of the fibers longer than 5 micron were detected using DT-PCM, which was more than 3 times the result obtained using the NIOSH method. The improvement in accuracy using DT-PCM is attributed to the increased visibility of thin fibers (diameters less than 0.1 micron). The largest variation in results was found to be due to the fiber distribution on the filters. This factor may be eliminated from interlaboratory comparisons, etc. by the use of pre-designated and well-defined fields-of-view.

<14>
UI - 6338839
MI - 83151821
AU - Hwang CY
AU - Wang ZM
TI - Comparison of methods of assessing asbestos fiber concentrations.
SO - Archives of Environmental Health. 1983 Jan-Feb;38(1):5-10
LM - Himmelfarb Library holds title
AB - Dimensional measurement of the counted fibers has important implications for setting of environmental standards to protect workers' health. Results of fiber concentrations as determined by different methods were compared. Each method was used to determine concentration by examining one sector of membrane filter on which fibrous dust was collected in various workplaces. The concentrations measured by the Asbestos International Association (AIA) method for 35 samples were, on the average, greater than the concentrations determined by the modified British Occupational Hygiene Society--Asbestosis Research Council (BOHS-ARC) method. The AIA and modified BOHS-ARC methods were found to be linearly correlated ($r = 0.82$). The mean of total fiber concentrations obtained by using the indirect transmission electron microscopy (TEM) method was 15.5 times the mean obtained by using the direct TEM method. The difference in concentrations determined by the two TEM methods resulted from disintegration of fiber bundles into single fibers during the ashing and ultrasonifying processes used in the indirect method. At least 83.5% of total fibers observed by TEM escaped detection by phase contrast microscopy.